SECTION 4

WINGS AND EMPENNAGE

TABLE OF CONTENTS

4-1. WINGS AND EMPENNAGE.

4-2. WINGS. (Refer to figure 4-1.)

4-3. DESCRIPTION. Each all-metal wing is a semi-cantilever, semimonocoque type, with two main spars and suitable ribs for the attachment of the skin. Skin panels are riveted to ribs, spars and stringers to complete the structure. An all-metal, piano-hinged aileron, flaps and a detachable wing tip are mounted on each wing assembly. A single metal fuel tank is mounted between the wing spars at the inboard end of each wing. Colored navigation lights are mounted at each wing tip.

4-4. REMOVAL. Wing removal is most easily accomplished if four men are available to handle the wing. Otherwise, the wing should be supported with a sling or maintenance stand when the fastenings are loosened.

a. Remove wing root fairings and fairing plates.
b. Remove all wing inspection plates.
c. Drain fuel from tank of wing being removed.
d. Disconnect:
1. Electrical wires at wing root disconnects.
2. Fuel lines at wing root. (Refer to precautions outlined in paragraph 12-3.
3. Pitot line (left wing only) at wing root.
4. Cabin ventilator hose at wing root.
e. Slack off tension on aileron cables by loosening turnbuckles, then disconnect cables at aileron bellcranks. Disconnect flap cables at turnbuckles above headliner, and pull cables into wing root area.

NOTE

To ease rerouting the cables, a guide wire may be attached to each cable before it is pulled free of the wing. Cable may then be disconnected from the wire. Leave the guide wire routed through the wing; it may be attached again to the cable during reinstallation and used to pull the cable into place.

f. Remove screws from strut fairings and slide toward center of strut.
g. Support wing at outboard end and remove strut-to-wing attach bolt.
h. Lower strut carefully to avoid damage to lower strut-to-fuselage fitting.

NOTE

It is recommended that flap be secured in streamlined position with tape during wing removal to prevent damage, since flap will swing freely.

i. Mark position of wing attachment eccentric bushings (refer to figure 4-1); these bushings are used to rig out "wing heaviness".
h. Remove nuts, washers, bushings and bolts attaching wing spars to fuselage.

NOTE

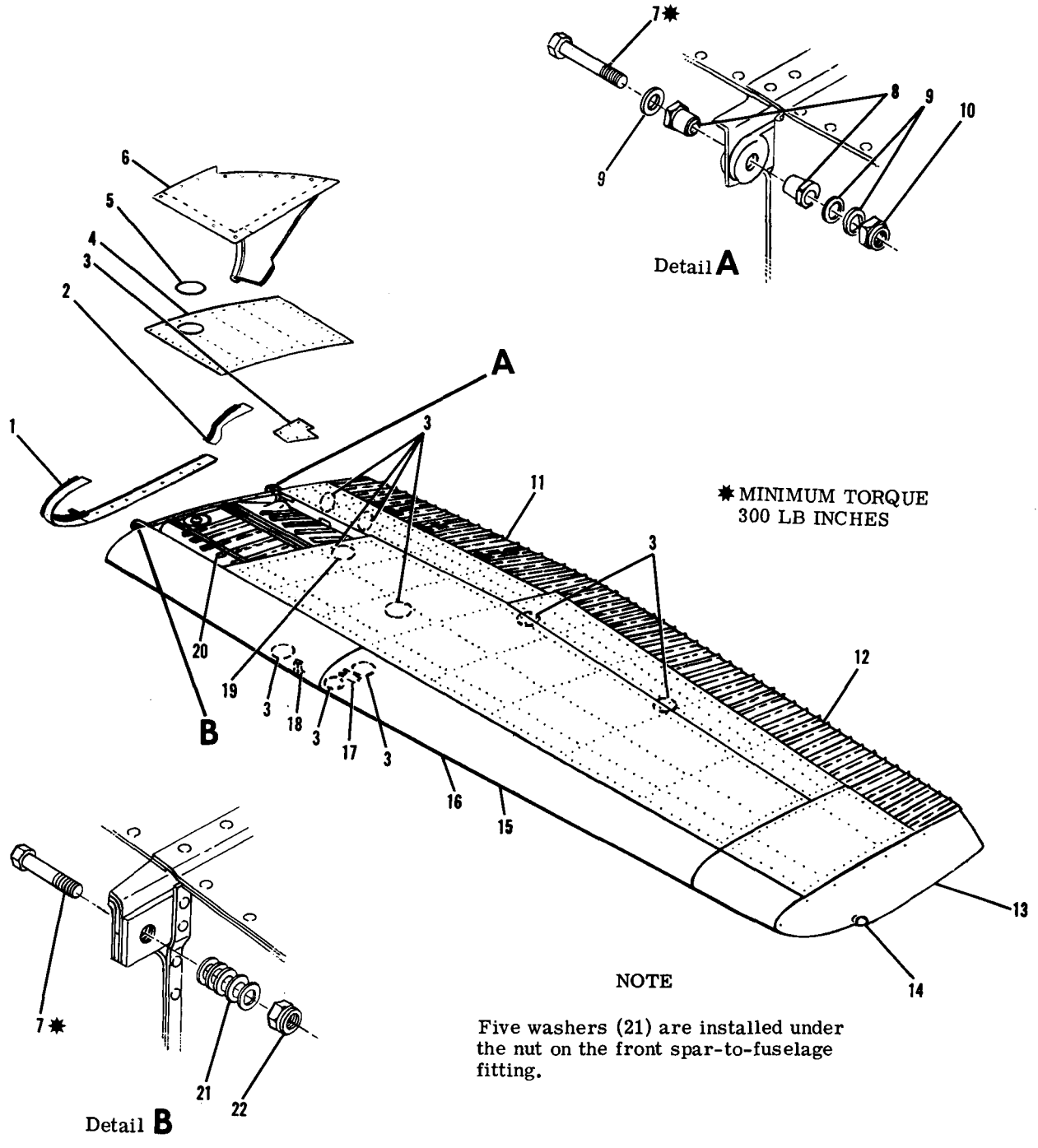
It may be necessary to rock the wing slightly while pulling attaching bolts, or to use a long drift punch to drive out attaching bolts.

i. Remove wing and lay on padded stand.

4-5. REPAIR. A damaged wing panel may be repaired in accordance with instructions outlined in Section 18. Extensive repairs of wing skin or structure are best accomplished using the wing repair jig, which may be obtained from Cessna. The wing jig serves not only as a holding fixture, making work on the wing easier, but also assures absolute alignment of the repaired wing.

4-6. INSTALLATION.

a. Hold wing in position and install bolts, bushings, washers and nuts attaching wing spars to fuselage



1. Fairing
2. Lower Rear Fairing
3. Inspection Plate
4. Fuel Tank Cover
5. Fuel Gage Access Cover
6. Wing-To-Fuselage Fairing
7. Bolt
8. Eccentric Bushings
9. Washer
10. Nut
11. Wing Flap
12. Aileron
13. Wing Tip
14. Position Light
15. Landing and Taxi Lights
16. Wing Assembly
17. Cover Plate
18. Stall Warning Opening
19. Courtesy Light
20. Fuel Tank
21. Washers
22. Nut

Figure 4-1. Wing Installation

fittings. Be sure eccentric bushings are positioned as marked.

b. Install bolts, spacers, and nuts to secure upper and lower ends of wing strut to wing and fuselage fittings.

c. Route flap and aileron cables, using guide wires. (See note in paragraph 4-4.)

d. Connect:

1. Electrical wires at wing root disconnects.

2. Fuel lines at wing root. (Refer to precautions outlined in paragraph 12-3.)

3. Pitot line (if left wing is being installed).

e. Rig aileron aystem. (Section 6.)

f. Rig flap system. (Section 7.)

g. Refuel wing tank and check for leaks. (Refer to precautions outlined in paragraph 12-3.)

h. Check operation of fuel gage.

i. Install wing root fairings.

NOTE

Apply fillet-type sealant (Permagum 576.1, Presstite Engineering Co.) or equivalent to area between cabin top skin and wing skin and also to area across top of lower strut fitting at skin cutout. Gap between windshield and wing leading edge is sealed with waterproof tape((Polyken 230 or 231, Kendall-Polyken Div.) or equivalent.

NOTE

Be sure to insert soundproofing panel in wing gap, if such a panel was installed originally, before replacing wing root fairings.

j. Install all wing inspection plates, interior panels and upholstery.

4-7. ADJUSTMENT (CORRECTING "WING-HEAVY" CONDITION. (See figure 4-1.) If considerable control wheel pressure is required to keep the wings level in normal flight, a wing-heavy condition exists.

a. Remove wing fairing strip on the wing-heavy side of the airplane.

b. Loosen nut (10) and rotate bushings (8) simultaneously until the bushings are positioned with the thick side of the eccentrics up. This will lower the trailing edge of the wing, and decrease wing-heaviness by increasing angle-of-incidence of the wing.

CAUTION

Be sure to rotate the eccentric bushings simultaneously. Rotating them separately will destroy the alignment between the off-center bolt holes in the bushings, thus exerting a shearing force on the bolt, with possible damage to the hole in the wing spar.

c. Tighten nut and reinstall fairing strip.

d. Test-fly the aircraft. If the wing-heavy condition still exists, remove fairing strip on the "lighter" wing, loosen nut and rotate bushings simultaneously until the bushings are positioned with the thick side of the eccentric down. This will raise the trailing edge of the wing, thus increasing wing-heaviness to balance heaviness in the opposite wing.

e. Tighten nut, install fairing strip, and repeat test flight.

4-8. WING STRUTS. (See figure 4-2.)

4-9. DESCRIPTION. Each wing has a single lift strut which transmits a part of the wing load to the lower portion of the fuselage. The strut consists of a streamlined tube riveted to two end fittings for attachment at the fuselage and wing.

4-10. REMOVAL AND INSTALLATION.

a. Remove screws from strut fairings and slide fairings along strut.

b. Remove fuselage and wing inspection plates at strut junction points.

c. Support wing securely, then remove nut and bolt securing strut to fuselage.

d. Remove nut, bolt, and spacer used to attach strut to wing, then remove strut from aircraft.

e. Reverse preceding steps to install strut.

4-11. REPAIR. Wing strut repair is limited to replacement of tie-downs and attaching parts. A badly dented, cracked, or deformed wing strut should be replaced.

4-12. FIN. (See figure 4-3.)

4-13. DESCRIPTION. The fin is primarily of metal construction, consisting of ribs and spars covered with skin. Fin tips are of ABS or glass fiber construction. Hinge brackets at the fin rear spar attach the rudder.

4-14. REMOVAL AND INSTALLATION. A fin may be removed without first removing the rudder. However, for access and ease of handling, the rudder may be removed by following procedures outlined in Section 10.

a. Remove fairings on either side of fin.

b. Disconnect flashing beacon lead, tail navigation light lead, antennas and antenna leads, and rudder cables, if rudder has not been removed.

c. Remove bolts attaching rear fin brackets to horizontal stabilizer.

d. Remove bolts attaching front fin brackets to fuselage; remove fin.

e. Install fin by reversing preceding steps. Be sure to check and reset rudder and elevator travel if any stop bolts were removed or settings disturbed.

4-15. REPAIR. Fin repair should be accomplished in accordance with applicable instructions outlined in Section 18.

4-16. HORIZONTAL STABILIZER. (See figure 4-4.)

4-17. DESCRIPTION. The horizontal stabilizer is primarily of all-metal construction, consisting of ribs and spars covered with skin. Stabilizer tips

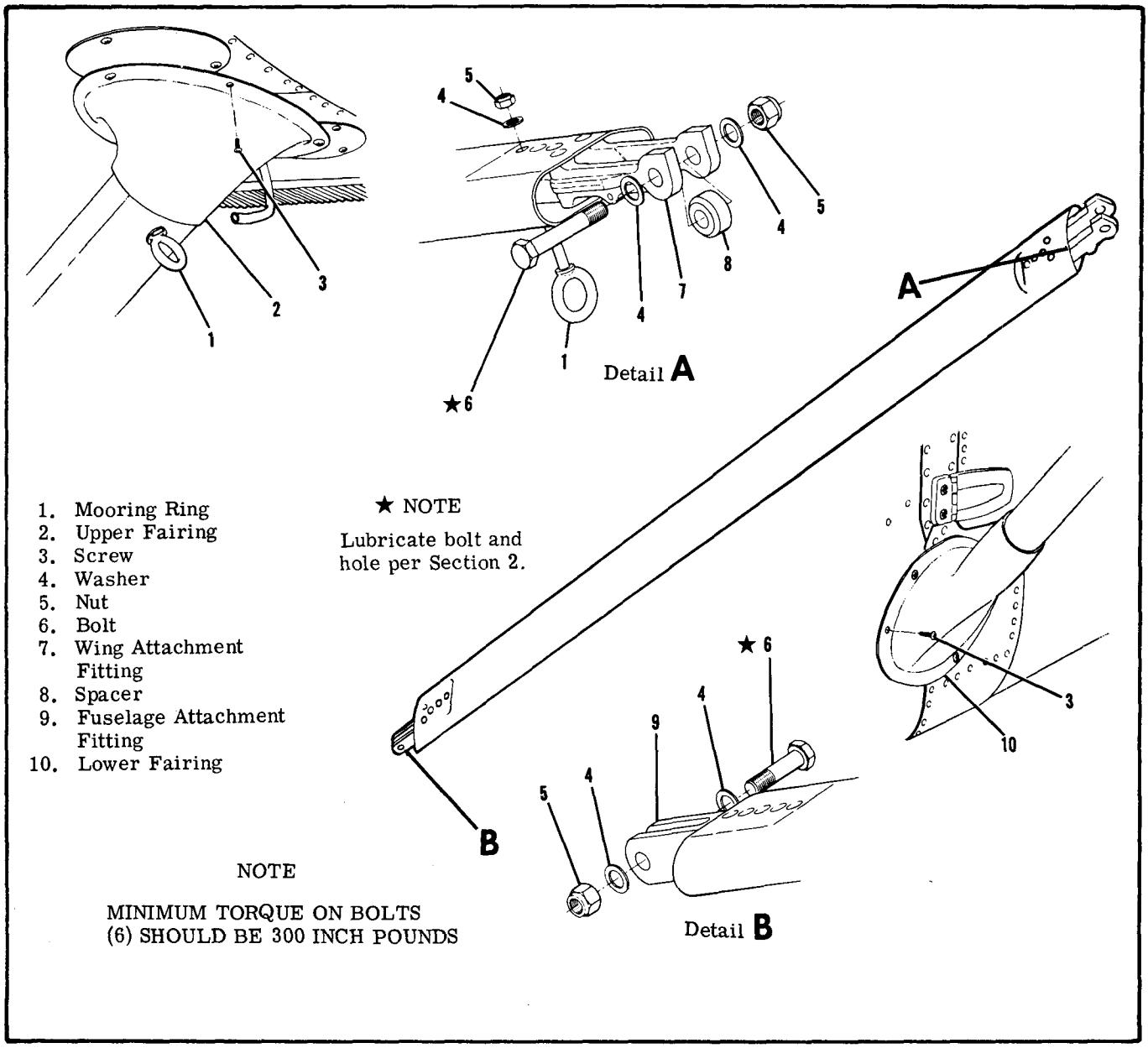


Figure 4-2. Wing Strut Installation

are ABS. A formed metal leading edge is riveted to the assembly to complete the structure. The elevator trim tab actuator is contained within the horizontal stabilizer. The underside of the stabilizer contains a covered opening which provides access to the actuator. Hinges are located on the rear spar assembly to support the elevators.

4-18. REMOVAL AND INSTALLATION.

a. Remove elevators and rudder in accordance with procedures outlined in Sections 8 and 10.

b. Remove vertical fin in accordance with procedures outlined in paragraph 4-14.

c. Disconnect elevator trim control cables at clevis and turnbuckle inside tailcone, remove pulleys which route the aft cables into horizontal stabilizer, and pull cables out of tailcone.

d. Remove bolts securing horizontal stabilizer to fuselage.

e. Remove horizontal stabilizer.

f. Install horizontal stabilizer by reversing preceding steps. Rig control systems as necessary. Check operation of tail navigation light and flashing beacon.

4-19. REPAIR. Horizontal stabilizer repair should be accomplished in accordance with applicable instructions outlined in Section 18.

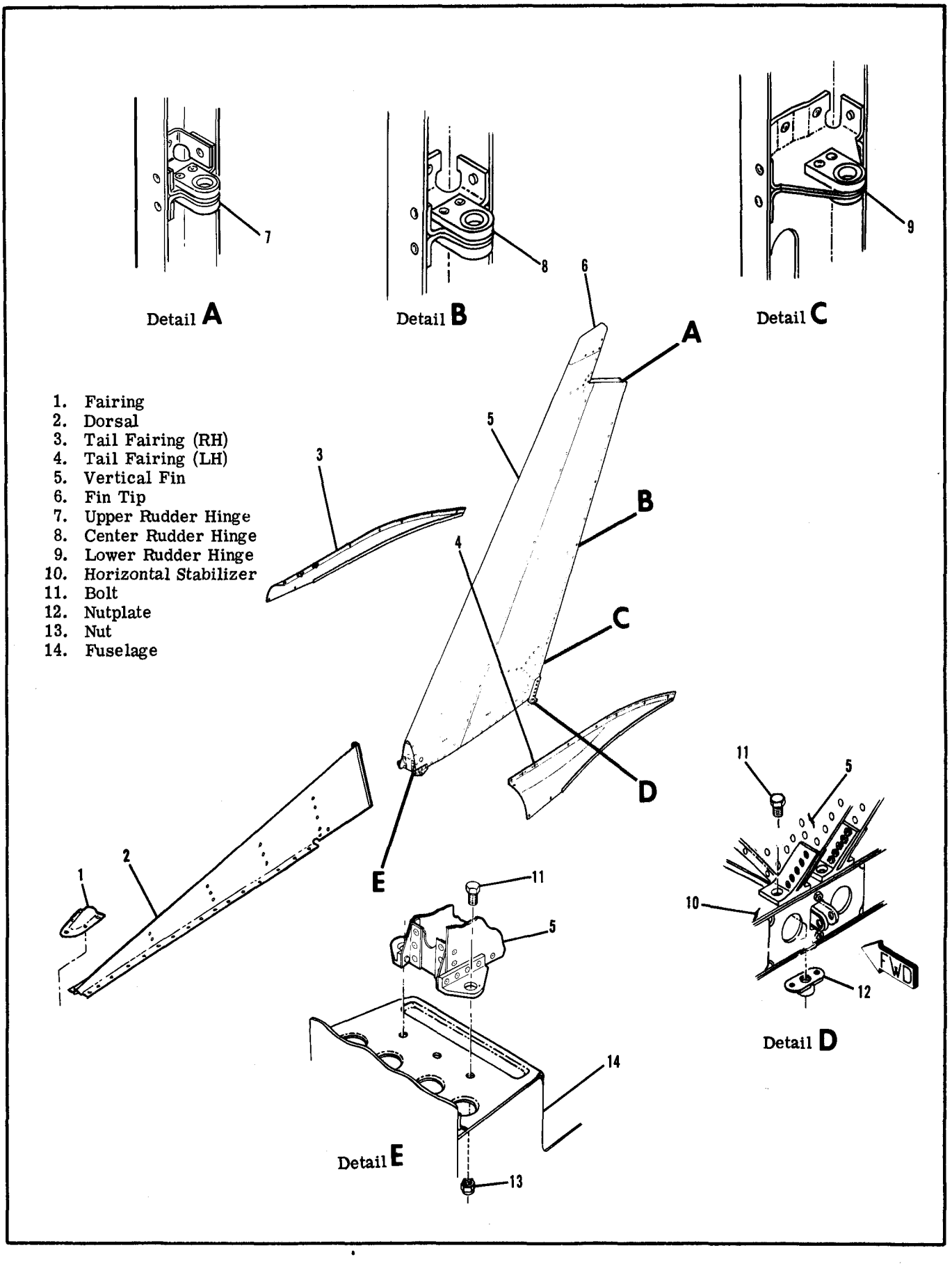


Figure 4-3. Vertical Fin Installation

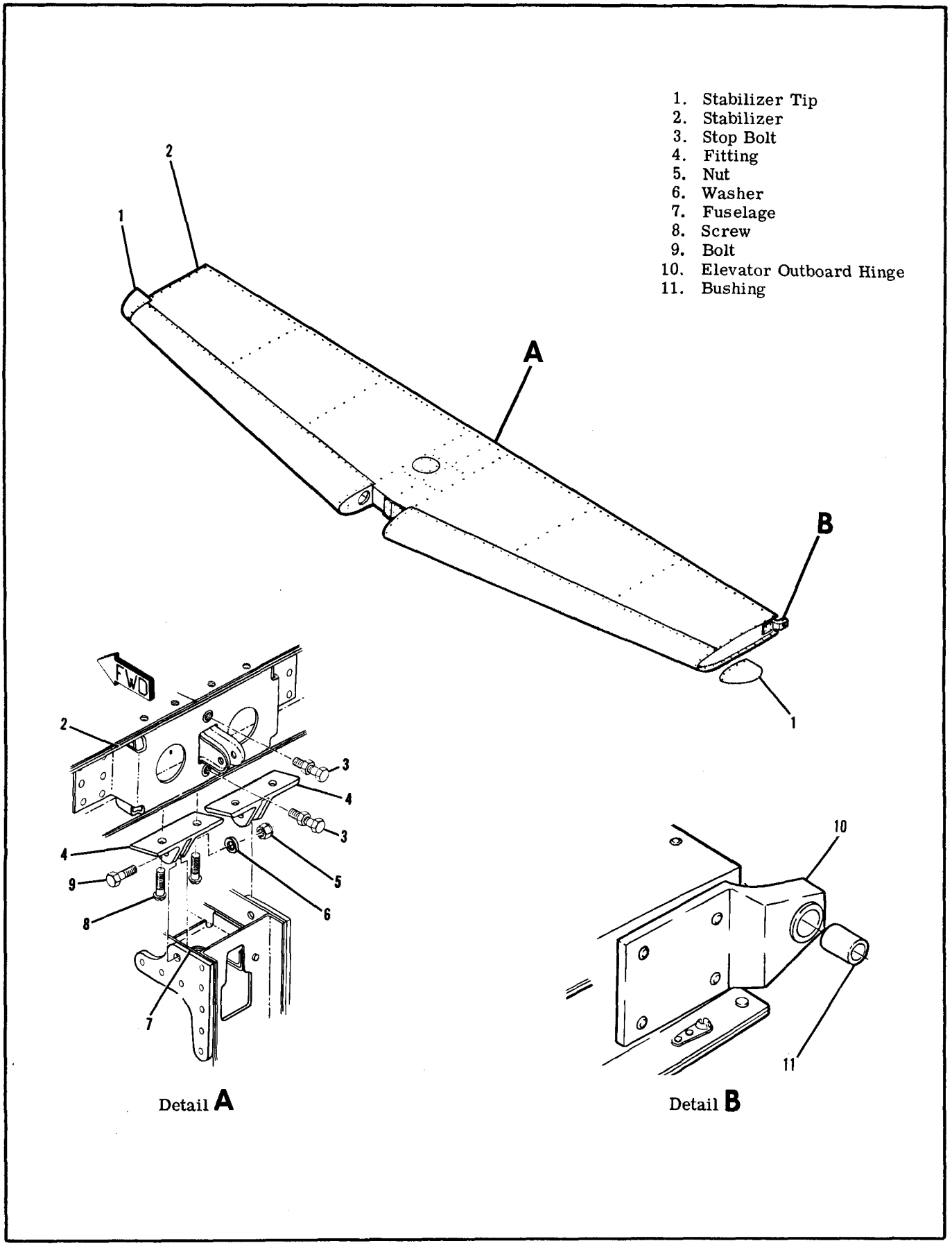


Figure 4-4. Horizontal Stabilizer Installation